

What is claimed is:

1 1. An aperture limiting element that has a wavelength selectivity, comprising:
2 an aperture that is an open space of a specified size formed in a substrate; and
3 in an area outside the aperture and that surrounds the aperture, a light filter is provided
4 wherein light of a specified wavelength λ_1 is transmitted, and light of a wavelength λ_2 is
5 prevented from passing straight through.

1 2. The aperture limiting element according to claim 1, wherein:
2 the light of wavelength λ_2 that is prevented from passing straight through is blocked, and
3 $\lambda_1 < \lambda_2$.

1 3. The aperture limiting element according to claim 1, wherein
2 the light of wavelength λ_2 that is prevented from passing straight through is diffracted
3 laterally, and $\lambda_1 < \lambda_2$.

1 4. The aperture limiting element according to claim 1, wherein the construction is such that the
2 difference in the optical path length of light of the first wavelength λ_1 that is transmitted by the
3 substrate and said filter versus the optical path length of light of the first wavelength λ_1 that
4 passes through the open space of said aperture is $m \cdot \lambda_1$, where m is a positive integer.

1 5. An aperture limiting element that has wavelength sensitivity comprising:
2 an aperture that is an open space of a specified size formed in a substrate;
3 in an area of the substrate that is outside the aperture, there is constructed a first light
4 filter in an inner first region that transmits light of first and second wavelengths λ_1 and λ_2 ,
5 respectively, and blocks light of a third wavelength λ_3 , where $\lambda_1 < \lambda_2 < \lambda_3$; and
6 in an area of the substrate that is outside the inner first region, there is constructed a
7 second light filter in an outer second region that transmits light of the first wavelength λ_1 and
8 blocks light of the second and third wavelengths λ_2 and λ_3 , respectively.

6. An aperture limiting element that has a wavelength sensitivity comprising;
 an aperture that is an open space of a specified size formed in a substrate;
 in an area of the substrate that is outside the aperture, there is constructed a first light filter in an inner first region that transmits light of first and second wavelengths λ_1 and λ_2 , respectively, and blocks light of a third wavelength λ_3 , where $\lambda_1 < \lambda_2 < \lambda_3$; and
 in an area of the substrate that is outside of the inner first region, there is constructed a second light filter in an outer second region that transmits light of the first wavelength λ_1 , and diffracts one and blocks the other of light of the second and the third wavelengths λ_2 and λ_3 , respectively.

7. The aperture limiting element according to claim 5, wherein the construction is such that:
 the difference in the optical path length for light of the first wavelength λ_1 that is transmitted by the substrate and said filter in said inner first region versus the optical path length for light of the first wavelength λ_1 that passes through the open space of said aperture is $p \cdot \lambda_1$, where p is a positive integer;
 the difference in the optical path length for light of the first wavelength λ_1 that is transmitted by the substrate and said filter in said outer second region versus the optical path length for light of the first wavelength λ_1 that passes through the open space of said aperture is $q \cdot \lambda_1$, where q is a positive integer; and
 the difference in the optical path length for light of the second wavelength λ_2 that is transmitted by the substrate and said filter in said inner first region versus the optical path length for light of the second wavelength λ_2 that passes through the open space of said aperture is $r \cdot \lambda_2$, where r is a positive integer.

8. The aperture limiting element according to claim 6, wherein the construction is such that:
 the difference in the optical path length for light of the first wavelength λ_1 that is transmitted by the substrate and said filter in said inner first region versus the optical path length for light of the first wavelength λ_1 that passes through the open space of said aperture is $p \cdot \lambda_1$,

5 where p is a positive integer;

6 the difference in the optical path length for light of the first wavelength λ_1 that is
7 transmitted by the substrate and said filter in said outer second region versus the optical path
8 length for light of the first wavelength λ_1 that passes through the open space of said aperture is q
9 $\cdot \lambda_1$, where q is a positive integer; and

10 the difference in the optical path length for light of the second wavelength λ_2 that is
11 transmitted by the substrate and said filter in said inner first region versus the optical path length
12 for light of the second wavelength λ_2 that passes through the open space of said aperture is $r \cdot \lambda_2$,
13 where r is a positive integer.

1 9. The aperture limiting element according to claim 1, wherein the substrate has the shape of a
2 truncated cone.

1 10. The aperture limiting element according to claim 9, wherein the substrate is formed of a
2 plastic material.

1 11. The aperture limiting element according to claim 3, wherein:

2 the ratio of the intensity of the zero-order diffracted light of the first wavelength λ_1
3 divided by the light of the first wavelength λ_1 that is transmitted by the substrate is 85% or
4 higher; and

5 the ratio of the intensity of the zero-order diffracted light of the second wavelength λ_2
6 divided by the light of the second wavelength λ_2 that is transmitted by the substrate is less than
7 the ratio of the intensity of a specified diffracted order of light of the second wavelength λ_2
8 divided by the intensity of light of the second wavelength λ_2 that is transmitted by the substrate.

1 12. The aperture limiting element according to claim 3, wherein the light filter is a diffraction
2 grating having concentric circles of diffractive structures, as viewed in a direction along the
3 optical axis of the light filter.

- 1 13. The aperture limiting element according to claim 3, wherein the light filter is a diffraction
2 grating having diffractive structures that, in cross section, have a staircase shape.
- 1 14. The aperture limiting element according to claim 8, wherein the diffraction grating diffracts
2 light of the second wavelength λ_2 or of the third wavelength λ_3 in a direction that initially
3 diverges from the optical axis.
- 1 15. The aperture limiting element according to claim 13, wherein the diffraction grating diffracts
2 light of the second wavelength λ_2 in a direction that initially diverges from the optical axis.
- 1 16. An optical pickup device that includes an objective lens, an optical pickup element, and the
2 aperture limiting element according to claim 1.
- 1 17. An optical pickup device that includes an objective lens, an optical pickup element, and the
2 aperture limiting element according to claim 2.
- 1 18. An optical pickup device that includes an objective lens, an optical pickup element, and the
2 aperture limiting element according to claim 3.
- 1 19. An optical pickup device that includes an objective lens, an optical pickup element, and the
2 aperture limiting element according to claim 4.
- 1 20. An optical pickup device that includes an objective lens, an optical pickup element, and the
2 aperture limiting element according to claim 5.
- 1 21. An optical pickup device that includes an objective lens, an optical pickup element, and the

aperture limiting element according to claim 6.

22. The optical pickup device according to claim 16, wherein the objective lens is a positive lens having a convex surface on the light-source side arranged so that the convex surface is inserted into the open space of the aperture.

23. The aperture limiting element according to claim 5, wherein the substrate has the shape of a truncated cone.

24. The aperture limiting element according to claim 6, wherein the substrate has the shape of a truncated cone.

25. The aperture limiting element according to claim 23, wherein the substrate is formed of a plastic material.

26. The aperture limiting element according to claim 24, wherein the substrate is formed of a plastic material.

27. The aperture limiting element according to claim 6, wherein:

the ratio of the intensity of the zero-order diffracted light of the first wavelength λ_1 divided by the light of the first wavelength λ_1 that is transmitted by the substrate is 85% or higher; and

the ratio of the intensity of the zero-order diffracted light of the second wavelength λ_2 divided by the light of the second wavelength λ_2 that is transmitted by the substrate is less than the ratio of the intensity of a specified diffracted order of light of the second wavelength λ_2 divided by the intensity of light of the second wavelength λ_2 that is transmitted by the substrate.

28. The aperture limiting element according to claim 6, wherein the light filter is a diffraction

2 grating having concentric circles of diffractive structures, as viewed in a direction along the
3 optical axis of the light filter.

1 29. The aperture limiting element according to claim 6, wherein the light filter is a diffraction
2 grating having diffractive structures that, in cross section, have a staircase shape.

1 30. The optical pickup device according to claim 20, wherein the objective lens is a positive lens
2 having a convex surface on the light-source side arranged so that the convex surface is inserted
3 into the open space of the aperture.

1 31. The optical pickup device according to claim 21, wherein the objective lens is a positive lens
2 having a convex surface on the light-source side arranged so that the convex surface is inserted
3 into the open space of the aperture.

1 32. The aperture limiting element according to claim 29, wherein the diffraction grating diffracts
2 light of the second wavelength λ_2 or of the third wavelength λ_3 in a direction that initially
3 diverges from the optical axis.